

The chemistry of exploration geochemistry: what's that?

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Understanding the chemical behaviour of elements in the supergene zone is a key to the rational application of exploration geochemical methods. However, the chemistry of many elements in this environment remains poorly understood. A starting point is the realisation that secondary minerals act as metal ion buffers between insoluble primary phases and wider chemical dispersion in the regolith.

Recent work on the geochemical behaviour of Sb and Bi has revealed some surprising outcomes in this regard and it is now possible to predict how anomalies of these metals will manifest themselves. Potential applications stem from the fact that the chemical dispersion of Sb and Bi is quite restricted. Sb and Bi are not particularly good pathfinder elements in the regional sense, but they are very good for pinpointing sources. Furthermore it is apparent that much geochemical work involving Bi conducted in the past requires review and that anomalies will have been overlooked. Similar approaches have been refined for the more common base metals Cu, Pb and Zn.

A number of Australian examples will be highlighted. These include Sb deposits of eastern and central New South Wales, and Bi-Mo deposits associated with granite intrusions of the eastern ranges. A geochemical model for anomalies associated with Cobalt-style deposits will also be discussed.